editor of Gassendi's works[*]), and afterwards at M. Thevenot's.[†] A few foreign visitors to Paris were present at these meetings. . . . It is possible that these Paris assemblies have given birth to several Academies in the rest of Europe. However, it is certain that the English gentlemen who created the Royal Society had travelled in France, and had visited at Montmort's and Thevenot's.

"When they were again in England they held meetings at Oxford, and kept on practising the exercises to which they had been accustomed in France. The rule of Cromwell was beneficial to these meetings. These English gentlemen, secretly attached to their legitimate lord, and unwilling to take any part in public affairs, were very glad to find an occupation which would give them an opportunity of living far from London without being suspected by the Protector. The Society remained in this state up to the time when Charles II., having resumed the kingly office, brought it to London, confirmed it by his regal power, and gave it privileges. So Charles II. rewarded the sciences which had lent an easy pretext for keeping the faith towards him."

The narrative explains that the creation of the Royal Society was an example given to Louis XIV. for establishing his Academy of Sciences.

THE TRANSIT OF VENUS

SINCE our last notice of the Transit observations, a letter, dated Mauritius, Dec. 10, has been received by the Astronomer Royal from Lord Lindsay, containing a detailed account of the results he obtained. Besides, a brief statement of the observations of Mr. Meldrum, the Director of the Government Observatory, Mauritius, has appeared in the *Times*, with news from other observers, which, with its comments upon them, we reproduce in a condensed form.

Mr. Meldrum, with a perfect telescope of six inches aperture, by Cooke, of York, has been fortunate enough to obtain an observation of the ingress, although both Lord Lindsay and the German party were prevented from doing this by the cloudy state of the sky. But, although Mr. Meldrum obtained the two interior contacts, clouds and haze were at intervals passing over the sun, which, in fact, was obscured during the greater part of the transit. At times, beautiful definitions of the planet were noted, especially soon after the first interior contact. Then there was a long period of obscuration, after which, most fortunately, the sun shone out for the second interior contact. Only the first exterior contact was lost, the sun not appearing at all until 6h. 16m. A few minutes before the last exterior contact the sun was again obscured, and when the clouds passed away the transit was over.

Lord Lindsay states that his expedition has been in a great measure successful. The morning of the 9th was cloudy before sunrise, and for a short time afterwards. The first external and first internal contacts were missed from this cause; the sun was not seen until 1h. 2m. after the first external contact, when it came out for a few minutes, when photographs and measures were obtained. It was not till 8 A.M. (local mean time) that it became fairly fine, and remained so with small periods of cloud obscuration until the end of the transit. Lord Lindsay took 271 plates, out of which number, perhaps, 110 will be of value. One of his photographs shows the second internal contact beautifully.

With the heliometer, Mr. Gill obtained five complete determinations of greatest and least distance of the centres of the sun and Venus, besides nine measures of cusps and two separate determinations of the diameter of Venus near the end of the transit. Dr. Copeland obtained, with the six-inch equatorial and Airy double-image micrometer, fifteen measures of least distance of Venus from the sun's limb, and ten measures of cusps. Dr. Copeland also observed the last internal and external contacts with this instrument. The last internal contact was observed with the four-inch equatorial and the polarising eye-piece by Mr. Gill. He also observed the last external contact with the heliometer. Both Dr. Copeland and Mr. Gill agree that the contacts of Venus and the sun are remarkably similar to those seen in the model. They also agree that any phenomena which could be classed under the head "black drop" took place and disappeared within a period of five seconds. All the photographic exposures are automatically registered on the chronograph by a method which gives the actual duration of the exposure. The heliometer observations were also registered there. Dr. Copeland observed by eye and ear; all other observations (photographic and heliometric) also observed by eye and ear as a check on the chronograph. The German expedition under Dr. Low got the third and fourth contacts, with three complete sets of heliometric measures.

With regard to the operations of the party sent out by the Government of Holland to Réunion, the further information shows that there, as at Mauritius, the ingress was missed altogether, in consequence of the bad weather. The second interior contact at egress was observed both by Dr. Oudemans and Dr. Soeters, not the least trace of the black drop being observed. Only nineteen plates could be exposed, and of these only two or three are considered of value. The observations with the heliometer were more successful. The party, instead of measuring the distance of the planet from the sun's edge along a radius, had calculated beforehand, for each ten minutes, the direction of the most favourable chord for determining, the relative parallax of Venus; two sets of eight measures of this kind were recorded.

Some observations made at Colombo by Mr. George Wall, and communicated to the *Ceylon Times*, are of great interest, as here is again recorded an exact reproduction of the appearance observed by Chappe d'Auteroche in 1769. On this the *Times* remarks that it is clear that science will lose much from an incomplete discussion of all the observations made in 1761 and 1769. On this subject we also draw attention to the following letter which we have received from Mr. E. W. Pringle, dated Manantoddi, Wynaad, Dec. 13:—

> "I make no apology for sending you a short account of the late transit as seen by me in Wynaad, especially as I feel some surprise at the difference between the expected and actual phenomena.
>
> "Owing to non-receipt of instruments from England, I had to fall back on a small 2½″ refractor by Cooke, of York, the definition of which is superb, even with a power of 53—that used on the occasion.
>
> "My station was on a hill nine miles from Manantoddi, about 800′ above that place and 3,600′ above sea-level.
>
> "The morning of the 9th was simply perfect; not a breath of air, and not a cloud, with the exception of a wisp or two of cirrus that the sun soon shook off.
>
> "The plateau beneath was wrapped in the fleecy mantle that proved so disastrous to the eclipse observers of 1871, but this I could afford to despise from my more lofty station.
>
> "I missed first external contact, and watched anxiously for the internal contact. When the planet was about half immersed, the entire disc became visible, for the portion external to the solar surface was surrounded by a fine silvery ring like a minute corona. This observation was verified by my brother, and the phenomenon was again visible at emersion.
>
> "As first internal contact approached I looked carefully for the 'black drop,' but, to my astonishment, the horns of the sun grew nearer and nearer, and at last seemed to fade into the last portion of the before-mentioned silvery ring, without my seeing the smallest vestige of the far-famed 'drop,' or any apparent

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[*] Montmort for years entertained Gassendi in his house. He was a very talented *bibliophile*, and all the books from his library now realise an immense value. He was a member of the Académie Française.

[†] Thevenot had travelled much, and was in constant correspondence with many travellers He had been appointed librarian to the King, and lived in the house where the library was kept, in what is now the Rue Vivienne, within a little distance of its present site.

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elongation of the limb of the planet. Had it existed to the extent of one hundredth of the diameter of Venus, I am confident I should have seen it.

"At last external contact I fancied that the limb of the sun at point of contact was broken more rapidly than it should be, but if there was a 'bead' it was a very minute one.

"At first internal contact, in spite of the low altitude of the sun, the definition of the perimeters of both it and the planet was excellent; but at last internal contact, owing to the great heat and a strong land breeze, there was some amount of atmospheric interference.

"The time of the transit was taken with an ordinary watch, a good goer, and I hope to be able to fix the position of the station before long, although such observations here must of course be of very secondary consideration.

"During the transit I tried to obtain absorption bands from the atmosphere of the planet, but failed, owing to insufficient power and the difficulty of keeping the slit of the stellar spectroscope used, on the planet, with altazimuth motion.

"I may mention that on the evening of the 9th there was a fair display of parhelia, just at sunset. The sky was then covered with delicate bands of cirrocumulus."

ON THE AGE OF AMERICAN STONE IMPLEMENTS, OR "INDIAN RELICS"

THE interest connected with the various forms of ordinary stone implements, of which arrow-heads are by far the most abundant form, is greatly lessened by the fact that nothing connected with their discovery bears upon the question of the date of their origin. We know about the date of the introduction of iron, by European visitors to our country, and therefore about the time of the abandonment of stone implements and weapons by the Red men; but concerning the time of the commencement of the use of stone here in the States we are almost wholly in the dark.

Having, during the past three years, had unusually favourable opportunities for collecting the various types of relics from a locality extraordinarily rich in them, we have endeavoured to learn something concerning the date of their origin by studying them *en masse* and *in situ*, as in this manner they at least suggest probabilities, which isolated specimens, gathered from numerous and distant localities, would never do. During the past three years we have gathered and carefully examined, as they were taken from the soil, over nine thousand stone implements, embracing fully nineteen twentieths of the forms described by Mr. John Evans in his "Ancient Stone Implements of Great Britain," and some twenty forms of weapons and household implements not mentioned in his work.

The result of the examination of this enormous collection of specimens on the spot where they were found, has been to convince us that the ruder forms, usually of slaty rock and other minerals softer than flint, are older, as a rule, than the beautiful jasper specimens found immediately above them. No such conclusions could be arrived at from merely examining these same specimens in a cabinet, and if these ruder and more elaborate forms were intimately associated in the soil, it would be difficult to dissociate them; but taking the history of the discovery of each specimen separately, we find that just in proportion as these relics are rude in manufacture and primitive in type, *they are more deeply embedded in the soil.* We have *never* met with a jasper (flint) arrow-head in or below an undisturbed stratum of sand or gravel, and we have but seldom met with a rude implement of the general character of European drift implements on the surface of the ground; and when such specimens did occur, there were generally some indications of unusually deep disturbance of the surface of the ground. Indeed, it is in fact just what it should be in theory, *i.e.*, the older forms are found alone, and at considerable depths below the surface; the newer and latest types found only at the surface, except when in graves, and associated with these a few specimens of the more archaic forms; just as we now in our own time see, in some isolated localities, household implements still in use, that, as a rule, have been discarded for better forms for more than a century. We repeat, that the conclusions arrived at by us we claim to be warranted by the fact of their applying to the collection of over nine thousand specimens gathered by us from a limited locality, and examined at the time of their discovery with special reference to the relationship the rude and elaborate forms bore to each other.

The belief here expressed with reference to the relationship of rude and elaborate relics is in accord with the division of the Stone Age into a Paleolithic and a Neolithic era; inasmuch as no indication of a *polish* has been found on any of the rude relics gathered by us; and polished celts and grooved axes with well-ground blades, or edges, occur only on the surface or in graves. It may be well to state here that by the phrase "on the surface" we mean on or in the soil that is now in cultivation. Relics that are upturned by the plough are considered as being "on the surface,"—beneath the surface being the stratum underlying the cultivated soil, and so beyond the reach of the ploughshare.

When and how the Atlantic coast of North America became peopled by the Red men cannot be determined by these same relics; but that that event should have been comparatively recent, and that such rude relics as we now find deeply embedded in the earth, and the magnificently wrought agate and jasper spears, and polished porphyry and hematic celts, should have been in use at the same time and by the same people, is simply incredible. We cannot now go into the full details of all the points of interest connected with our discoveries, but offer with confidence to students of American archæology this fact, that the paleolithic relics are immensely older than the elaborately worked surface-found forms. This fact, we believe, is a powerful support to the theory (if, indeed, it needs further demonstration) of the gradual development of man from the condition we call savagery.

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NOTES

THE invitation addressed by the King of Siam to the Royal and the Astronomical Societies ought to be gratifying to scientific men in more ways than one; it is one more evidence of the spread of a respect for science, and of an idea, however vague, of its high value. The letters amount, indeed, as the *Times* remarks, to the offer of a large subsidy on the part of the King, and are no empty compliment. They indicate in the clearest manner the effect which the steady prosecution of inquiries by the most civilised is having in the less civilised countries; an effect of an important kind, which it would be difficult to arrive at in any other peaceful way. The following is the text of the King's letter to the Astronomical Society:—"The Royal Palace, Bangkok, Oct. 9, 1874.—My dear sir, I have much pleasure in informing you that I have received the commands of his Majesty to request you to inform the Royal Astronomical Society that if it will appoint men of science to observe the total eclipse of April next, his Majesty will be happy to consider them as his private guests during their visit, and will take on himself their entertainment and provide them with transport for themselves and their instruments from Bangkok to the station selected by them and back again, and will erect such temporary buildings as are required for them and their assistants. A communication to this effect will be made by his Excellency the Minister for Foreign Affairs to the Acting British Consul-General here; but as this will be slow in reaching the gentleman interested, his Majesty has commanded me to address this note to you to communicate it to the Society as soon as possible. I shall be most happy to

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